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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/186,810
Filing Date: November 05, 1998
Appellant(s): CARLYLE ET AL.

Hallie A. Finucane
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed May 29, 2007 appealing from the Office action mailed October 27, 2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The following are the related appeals, interferences, and judicial proceedings known to the examiner which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal:

As explained by the Appellant, parent application 00/014,087 is currently before the Board of Appeals for consideration of an appeal therein. The decision therein should have a direct affect on the present appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct. It is noted that the summary does not refer to the drawings by reference number. However, since no reference numbers are used therein and since the drawings are not necessary for understanding the invention, the conferees thought that this provisions of Rule 41.37 (c) were met the extent required.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

It is noted, however, that the heading "B" in the arguments section (page 10 of the Brief) is not correct in that it references the first instead of the second paragraph of 35 USC 112.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

5,308,641	Cahalan et al	5-1994
5,613,982	Goldstein	3-1997
EP0476983	Bayne et al	3-1992

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 46 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no original support for the preclusion of a linker molecule as now claimed when the polypeptide growth factor is covalently bonded

to the surface; see lines 1-2 of claim 46. In fact, the claim language even states that the crosslinking agent functions "to link the crosslinking agent directly with the polypeptide growth factor and the substrate"; see lines 3-6. Furthermore, the claimed invention does not appear to be enabled since a linker molecule is necessary for the invention to work as disclosed since the covalent attachment of crosslinking agent to the tissue requires attachment to some molecule of the tissue.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 46 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 46, preclusion of a linker molecule is confusing and renders the claim language indefinite in that a molecule on the tissue must link to the crosslinking agent to bond it thereto. Furthermore, the crosslinking molecule is used as or acts as a linker molecule so the preclusion of it is confusing. In this way, the claim language is internally inconsistent in that it both precludes "a linker molecule" and yet later states that the crosslinking agent functions "to link the crosslinking agent directly with the polypeptide growth factor and the substrate"; see lines 3-6.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA

1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 8, 10, 13, 15, 34, 35, and 38-40 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 2, 9, 14, and 21 of copending Application No. 09/014,087. The present claims are obvious over the copending claims because the same embodiment is set forth herein such that the claims set read on each other and are clearly obvious in view of each other.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, 8, 9, 15, and 45-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Cahalan et al (US 5,308,641). Cahalan anticipates the claim language where the natural tissue as claimed is the human or animal tissue of Cahalan, and the crosslinking agents as claimed are the combination of the of dialdehydes and the polyalkylimine of Cahalan (see column 6, lines 8-51 where the polyalkylimine and

crosslinking agent are used together to link the biomolecule to the solid surface; the solid surface can be a natural tissue).

In other words, the molecules of an aldehyde and polyalkylimine are joined to form a crosslinking agent that directly attaches polypeptide growth factor to the substrate; see especially column 4, lines 20-62, the abstract, and column 6, lines 8-51. Said another way, the dialdehyde molecule (call it molecule A) is used to both attach the polyalkylimine (call it molecule B) to the solid surface (see column 3, lines 21-29) and to attach the polyalkylimine to the biomolecule; see column 6, lines 29-51. Thus, the crosslinking agent(s) as claimed are met by the molecular sandwich(es) (**A-B-A**) of Cahalan.

Cahalan discloses that one purpose of the surface treatment is to "promote the attachment and growth of a normal cell layer"; see column 1, lines 33-43. For this reason, it stimulates the "association of viable cells with the substrate" as claimed.

With regard to claim 8, the xenograft tissue as claimed is clearly implied by the animal tissue disclosed by Cahalan such that this claim language is considered fully met thereby; see column 4, lines 32-33.

Regarding claim 15, Applicants are directed to column 4, lines 36-43 where some of the same biomedical devices are disclosed as substrates.

With regard to claim 46, the claim is considered internally inconsistent in that it both precludes a linker molecule and states that the crosslinking agents link the growth factor with the substrate. With the understanding that the molecular sandwich (A-B-A)

of Cahalan is the crosslinking agent as claimed, the claim language is considered fully met to the extent that it can be understood.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cahalan et al (US 5,308,641) in view of Goldstein (US 5,613,982). Cahalan discloses medical devices/implants where the crosslinking agent glutaraldehyde attaches the growth factor biomolecule and to the substrate-spacer. Cahalan's solid surface can be made of human or animal tissues (see column 4, lines 32-33), but Cahalan lacks the types of tissues claimed.

However, Goldstein teaches that it was known to make similar medical devices/implants out or heart valves, pericardial tissue and the like; see especially column 3, lines 14-24.

Therefore, it is the Examiner's position that it would have been obvious to use heart valve or pericardial tissue for Cahalan's solid surface in order to reduce the risk of disease transmission and cost over using human tissue. Furthermore, it would have been obvious to use these tissues for the same reasons that Goldstein desires the same.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cahalan et al in view of Bayne et al (EP 0476983).

With regard to claim 13, Cahalan fails to disclose the use of VEGF as claimed even though it discloses utilizing many other growth factors therewith. Bayne teaches that it was known to use VEGF as the growth factor in a similar fashion within the same art; see the see page 8, lines 14-26.

Therefore, it is the Examiner's position that it would have been obvious to an ordinary artisan to use VEGF as the growth factor of Cahalan so that the implant could be successfully implanted in vascular regions of the body.

(10) Response to Argument

Issue A

In response to the argument that the crosslinking agents of the present invention are not linker molecules (see page 9 of the Brief), the Examiner asserts that the crosslinking agents are even claimed as molecules that link the growth factor to the substrate; see lines 3-6 of claim 46. For this reason, the crosslinking agent molecule is clearly a linker molecule in that it has the same structure and function as a linker molecule. In other words, it is a type of linker molecule.

Upon review of the specification on pages 17, line 5 to page 19, line 19, as suggested by the Appellant, it is clear that there is no special definition for a linker molecule. Rather, exemplary language is used to describe the linker molecule. It is clear that the crosslinking agent performs the same function as a linker molecule. Therefore, it appears that the only difference between the linker molecule and the

crosslinking agent is what one calls it. A crosslinking agent is merely a type of linker molecule.

Additionally, polyalkylimine is also used as a crosslinking agent in the chemical and medical arts and is called a crosslinking agent. Extrinsic evidence of this fact is provided as an attachment to the present Examiner's Answer; see the excerpts from Japanese patent JP363245675A, US Patent 4,788,280, US Patent Publication 20020242726, and US Patent Publication 20050042240 attached hereto. Note that polyethyleneimine is one of the polyalkylimine molecules disclosed by Cahalan (see column 3, lines 8-9) and is merely a species of polyalkylimine. Therefore, contrary to the Appellant's argument, the Examiner asserts that there is no difference between a polyalkylimine and a crosslinking agent. For this reason, there is no clear support to preclude linker molecules.

It is noted, however, that the specification appears to say that use of a linker molecule is optional; see page 16, lines 31-34. But the specification goes on to explain that a crosslinking agent can perform this function; see page 17, lines 5-21. At the very least, the line between what constitutes a linker molecule and what doesn't is not clear.

As a result, there is no original support for precluding a linker molecule when a crosslinking agent is clearly a type of linker molecule. Furthermore, the invention is not enabled where linker molecules are precluded because one could not make the claimed invention.

Issue B

It is noted that the Appeal Brief heading for the section is not correct and should be directed to the second paragraph not the first paragraph of 35 USC 112.

On page 11 of the Brief, the Appellant argues that they are allowed to claim negative limitations. The Examiner agrees, but in some cases, as in the present one, negative limitations can make a claim indefinite. As in claim 46, where the claim precludes a type of molecule (see lines 1-2) but later states a species thereof is present (see lines 3-6), the claim becomes internally inconsistent. For this reason, the scope of claim 46 is considered indefinite.

The differences in approach, as argued by the Appellant, appear to suggest that the methods of making the invention (i.e. a linker molecule vs. a crosslinking agent) are different. However, the present claim is directed to a final product and the present claims do not even set forth any product-by-process limitations.

Issue C

With regard to the double patenting rejection, the Appellant has implicitly asked that the rejection be held in abeyance until the patentability of the two applications involved is determined.

Issue D

The Appellant argues that the Examiner has taken an impermissibly broad interpretation by "alleging that polyalkylimine is a crosslinking agent"; see page 13 of the Brief. However, the Examiner asserts that the specification fails to clearly define a linker molecule as different from a crosslinking agent and only uses exemplary

language in this regard; see pages 17 to 19 of the specification. For this reason, the Examiner has concluded there is no special definition for a linker molecule. To invoke a special definition, the specification must clearly set forth a special definition explicitly and with reasonable clarity, deliberateness, and precision; see MPEP 2111.01 and *Teleflex Inc. v. Ficosa North America Corp.*, 63 USPQ2d 1374, 1381 (Fed. Cir. 2002).

Moreover, contrary to the Appellant's argument, polyalkylimine is a type of crosslinking agent; see the attached excerpts from Japanese patent JP363245675A, US Patent 4,788,280, US Patent Publication 20020242726, and US Patent Publication 20050042240. Note that polyethyleneimine is one of the polyalkylimine molecules disclosed by Cahalan (see column 3, lines 8-9) and is merely a species of polyalkylimine.

Next, the Appellant argues that the claims are limited by what Cahalan defines as a crosslinking agent. However, the Examiner cannot see how a statement in Cahalan can limit the Appellant's claim scope. Furthermore, the so called definition of Cahalan is merely an statement exemplifying what Cahalan can include in that is states the "crosslinking agent employed in the present invention **can** be any crosslinking agent which is at least difunctional in aldehyde groups"; see column 4, lines 58-62. [emphasis added]

Moreover, it is not inconsistent with Cahalan's disclosure to call a molecule that functions as a crosslinking agent and is considered to be crosslinking agent in that art a crosslinking agent even if Cahalan does not call it the same. It is believed that Cahalan

avoids calling polyalkylimine a crosslinking agent to avoid confusion with the aldehyde crosslinking agent.

On page 14 of the Brief, the Appellant argues that the present specification distinguishes what is considered a crosslinking agent. However, as explained previously, the crosslinking agent has no special definition. Furthermore, the specification clearly teaches that the crosslinking agent functions as a linker molecule to attach the growth factor VEGF; see page 6, lines 25-27 and page 17, lines 5-21.

Finally, the Examiner would like to reiterate that the Examiner is interpreting "crosslinking agents" of the present claims to be equivalent to the A-B-A sandwiches of Cahalan, because the A-B-A sandwiches contain at least four aldehyde groups and because the three types of molecules of the sandwiches are all crosslinking molecules. With this interpretation, the crosslinking agents directly bond the biomolecule to the substrate.

Issue E

The Appellant relies on the traversal of the 35 USC 102 rejection utilizing Cahalan to argue that claim 10 is patentable. Therefore, the rejection of claim 10 should stand or fall with the patentability determination made with regard to base claim 1.

Issue F

The Appellant relies on the traversal of the 35 USC 102 rejection utilizing Cahalan to argue that claim 13 is patentable. Therefore, the rejection of claim 13

should stand or fall with the patentability determination made with regard to base claim 1.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Paul Prebilic/
Paul Prebilic
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Appendix of Extrinsic Evidence

PAT-NO: JP363245675A

DOCUMENT-IDENTIFIER: JP 63245675 A

TITLE: HOLLOW FIBER MEMBRANE FOR IMMOBILIZATION OF ENZYME AND PRODUCTION THEREOF

PUBN-DATE: October 12, 1988

INVENTOR-INFORMATION:
NAME
ISHIZUKA, HIROTOSHI
ITO, MASAAKI
HIBINO, TAKESHI
OKADA, TAKESHI
SAHASHI, HIROKO

ASSIGNEE-INFORMATION:
NAME COUNTRY
NITTO ELECTRIC IND CO LTD N/A

APPL-NO: JP62080714

APPL-DATE: March 31, 1987

INT-CL (IPC): C12N011/08, B01D013/00 , B01D013/04 , C08J009/36 , D01D005/24 , D01F006/76

US-CL-CURRENT: 435/180

ABSTRACT:

PURPOSE: To obtain the titled membrane capable of keeping high activity over a long period, having excellent separation performance of a low-molecular weight product which is a reaction product with a substrate and useful as an immobilized enzyme membrane, etc., in high efficiency, by impregnating and adsorbing an aqueous solution of a water-soluble polymer having ≥2 functional groups into a specific hollow fiber membrane from the side of porous layer and crosslinking the adsorbed polymer.

CONSTITUTION: The hollow fiber membrane used as a starting material of the objective membrane is made of an aromatic polysulfone, etc., and is an asymmetric ultrafiltration membrane composed of an outer dense layer having a fractional molecular weight of 1,000∼1,000,000 and an inner porous layer supporting the dense layer and having a pore diameter of 0.05∼10μ. An aqueous solution of a water-soluble polymer having ≥2 functional groups e.g. polyethyleneimine or polyarylamine having a weight-average molecular weight of 1,000∼200,000 and a functional group number of from several tens to several hundreds is impregnated into the hollow fiber membrane from the side of the porous layer under a pressure of 0.1∼1.0kg/cm<SP>2</SP> to effect physical adsorption of the polymer to the membrane. A solution of a **crosslinking agent such as polyethyleneimine** or polyarylamine is impregnated into the above membrane. The molar concentration ratio of the functional group in the water-soluble polymer to the functional group in the crosslinking agent is selected

to 2∼50. The polymer in the membrane is crosslinked by this process to obtain the titled membrane containing a water-soluble polymer in a porous layer of a hollow fiber membrane is a crosslinked state.

US-PAT-NO: 4788280

DOCUMENT-IDENTIFIER: US 4788280 A

TITLE: Polysaccharide derivatives containing aldehyde groups on an aromatic ring, their preparation from the corresponding acetals and use in paper

---------- KWIC ---------

Detailed Description Text - DETX (46):

A **polyethyleneimine (PEI) crosslinker** (mol. wt. 60,000) was used with the aromatic acetal starch derivative. It was added to the pulp at 30 lb./ton after the starch dispersion and just before the headbox. The starch and polymer dispersions were then added to the paper furnish at 10 lb./ton. The furnish was a bleached softwood Kraft. The paper sheets were prepared on the Noble and Wood Sheet Mold. The paper weight was about 5 lb./1000 ft..sup.2. The wet and dry tensile strength results are shown in Table II. The wet web strength results are shown in Table III.

DOCUMENT-IDENTIFIER: US 20040242726 A1

TITLE: Pigment dispersion and ink composition for ink-jet

---------- KWIC ---------

Detail Description Paragraph - DETX (27):

[0171] 4 Parts of a polycarbonate type polyurethane resin (acid value 30, triethylamine neutralization, solid content 40%) and 2 parts of a 30% **polyethyleneimine type crosslinking** agent (amine hydrogen equivalent 650, completely water-soluble) were added to the dispersion liquid, and the resultant mixture was stirred at 90.degree. C. for 3.5 hours to crosslink the resin in the dispersion liquid.

Detail Description Paragraph - DETX (42):

[0184] 4 Parts of a polycarbonate type polyurethane resin (acid value 30, triethylamine neutralization, solid content 40%) and 2 parts of a 30% **polyethyleneimine type crosslinking** agent (amine hydrogen equivalent 650, completely water-soluble) were added to the dispersion liquid, and the resultant mixture was stirred at 90.degree. C. for 2.5 hours to crosslink the resin in the dispersion liquid.

DOCUMENT-IDENTIFIER: US 20050042240 A1

TITLE: High viscosity antibacterials

---------- KWIC ---------

Summary of Invention Paragraph - BSTX (32):

[0031] If desired, crosslinking agents may be applied, for example **polyethyleneimine, which is capable of crosslinking** polyvinylpyrrolidone in an alcohol-water mixture to create a gel-like formulation. Other crosslinking agents may be used in a manner known to those skilled in the art, for example glutaraldehyde or acetic anhydride. Other crosslinking agents may comprise e-beam radiation, gamma radiation, sulfuric acid, various acrylate compounds, calcium pantothenate, aspartic acid, glutamic acid, sodium borate or various sulfate and phosphate compounds, used in a manner appropriate to the particular chemistry of the crosslinking agent used.

Summary of Invention Paragraph - BSTX (51):

[0050] In a third embodiment, a gel may be prepared from a mixture of about 60-80 volume (v/v) percent of ethyl or isopropyl alcohol having 1 to 20 weight percent (w/w) of polyvinylpyrrolidone, which is generally a body-cleaning agent, for example having a molecular weight of about 44,000; from 0.1 to 2 weight percent (w/w) of **polyethyleneimine as a crosslinking** agent; and, optionally, up to about 10 percent (w/w) of polyethylene glycol, for example of a molecular weight of about 400. About 20 to 40 volume percent of water may be added to make up 100 volume percent, to provide a generally optically clear gel material.

Summary of Invention Paragraph - BSTX (52):

[0051] Similar gel formulations may be prepared where the **polyethyleneimine crosslinking** agent is replaced by another known crosslinking agent such as 0.5 to 10 weight percent (w/w) of glutaraldehyde or 0.5 to 10 weight percent (w/w) of acetic anhydride.

Claims Text - CLTX (17):

16. The formulation of claim 15 in which said viscosity increasing agent comprises polyvinylpyrrolidone **crosslinked with polyethyleneimine**.

Claims Text - CLTX (22):

21. The cannula of claim 19 in which said viscosity increasing agent is polyvinylpyrrolidone **crosslinked with polyethyleneimine**.